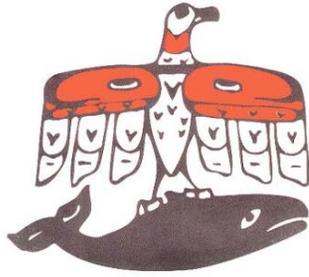


# Makah Renewable Energy Feasibility Study in Neah Bay Washington

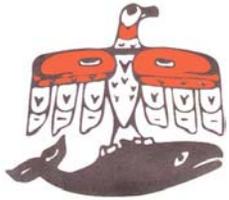


**Makah Project Manager: Bud Denney**  
**Technical Contact: Bob Lynette**  
**November 18, 2003**

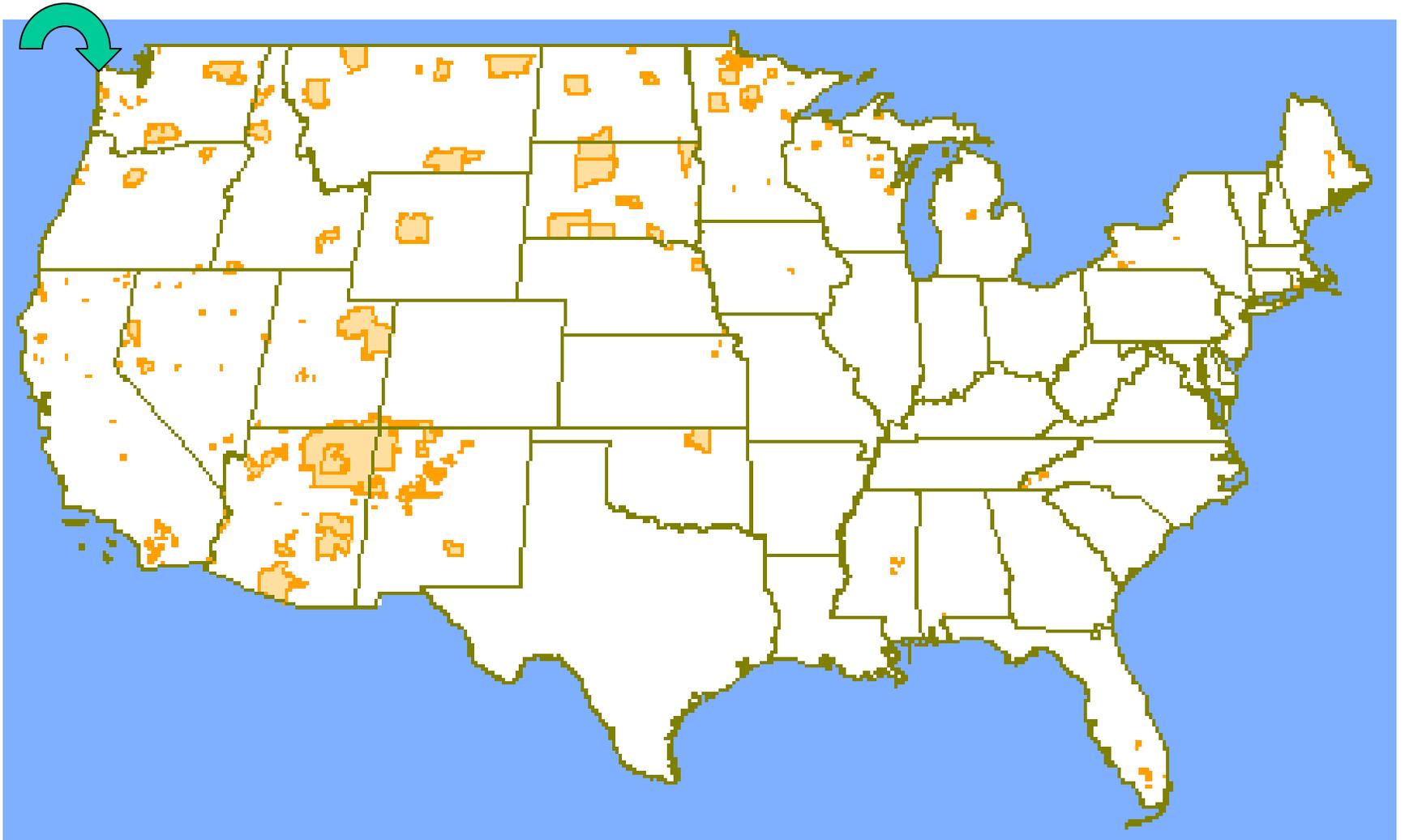


# Background

- Enrollment for the Makah Tribe is 2,389
- Approximately 1,213 tribal members live on the Reservation; an additional non- Indian residential population of about 295
- Reservation is 47 square miles with elevations typically between 500 and 1,000 feet
- Four major watersheds; over 100” rainfall/year
- Closest town is 60 miles away.
- 30 MW line to reservation; frequent loss of power

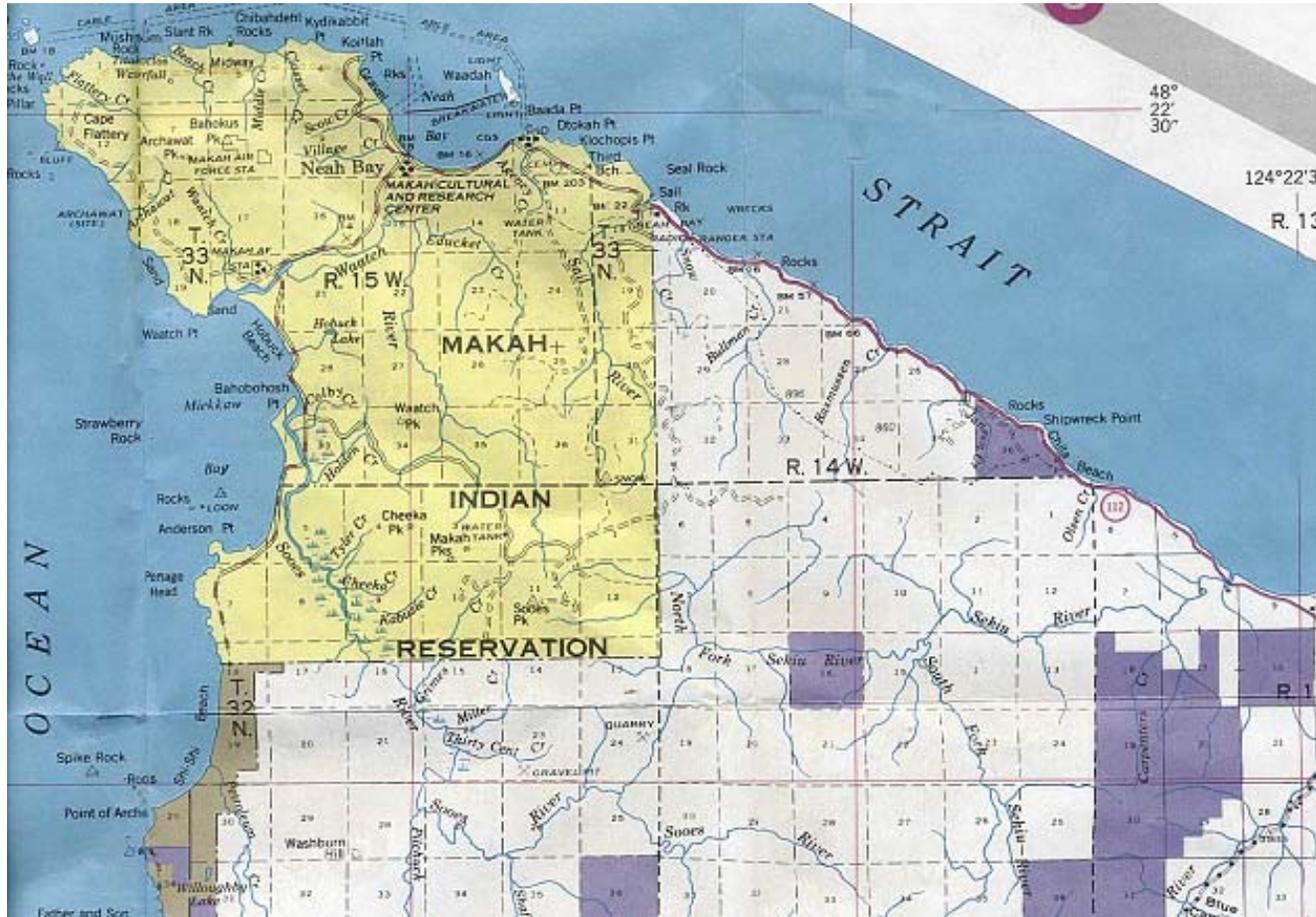


# Makah Reservation





# Makah Reservation





# Participants

<b>Project Participant</b>	<b>Contact</b>	<b>Role</b>
Makah Indian Reservation	Bud Denney	Tribal planner, Project manager / liaison
Springtyme Company, L. L. C.	Robert Lynette	Technical contact, wind consultant
AP&T Solutions, LLC*	Bob Grimm	Financial analyst
	Larry Coupe	Engineer, hydropower
John Wade Wind Consultant LLC	John Wade	Meteorologist, wind power analyst
Northwest Wildlife Consultants	Karen Kronner	Biologist
Met Tower Services	Mike Sailor	Wind tower installation
*A subsidiary of Alaska Power & Telephone		



# Project Overview

## Objectives

- Determine feasibility of one or more wind power and/or small hydro installations that could provide one or more of the following functions:
  - Produce electricity for the Tribe
  - Produce power to sell to Clallam County PUD
  - Provide back-up power
  - Provide employment during construction and O&M



# Project Overview

- Avian study to identify areas where wind turbines should be prohibited.
- Wind Resource Assessment
  - 2 sites for wind resource assessments
  - 50-meter towers
  - Monitor sites for one year



# Micro/Small-Hydroelectric Power

- Identify potential sites
  - Adequate stream flow
  - Adequate head
  - Proximity to existing transmission lines
  - Downstream barriers to fish migration
- Conduct on-site field analyses
- Develop/calculate critical parameters



# Final Site Feasibility Report

- Site layout
- Interconnect and transmission diagrams
- Equipment, infrastructure
- Annual energy output
- Financial analyses
  - COE
  - Financing options and potential financing sources



# Project Status - Wind

- Sites for met towers selected in conjunction with wildlife study.
- Sites prepared for met tower installations.
- Two 50-meter NRG suites of equipment installed in July 2003 and collecting data.
- Preliminary utility analysis conducted to determine potential for handling output.



## Project Status – Micro-hydro

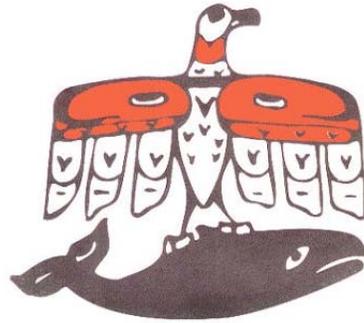
- Field trip conducted – 2 potential projects identified.
  - 500 kW, producing approximately 1,300,000 kWh per year
  - 900 kW, producing approximately 3,100,000 kWh per year
  - Both projects would also provide water supply .
- Preliminary report prepared and being reviewed.



## Project Status – Future Activities

- Wind Energy
  - Collect and analyze data through 6/04.
  - If early data looks good, commence project definition.
  - Prepare final project plans and business plan.
- Micro-hydro
  - Tribe's review of preliminary report.
  - If favorable, identify funding sources.

# Future Plans



- Phase 2 funding application approved by DOE and will be discussed tomorrow.